

REMARKS

The following remarks are in response to the Examiner's statements in the Office Action dated February 22, 2006.

Claims 1-26 and 50-72 are withdrawn per the Response to Restriction Action dated December 5, 2005. Claims 27, 43, and 44 are amended. Claim 42 is canceled without prejudice looking forward to filing divisional applications. Claims 27-41 and 43-49 are in the case.

Applicants note the Examiner has reviewed the Information Disclosure Statements that have been filed in the case. Applicants thank the Examiner for his careful review.

In paragraph 1 of the Examiner's Action, the Examiner has objected to the Abstract that has been revised by amendment. Applicants assert that the Abstract is now acceptable.

In claim 27, Applicants have amended the claim to recite that the reinforced layer is a cured thermoset fiber composite in order to clarify the sharp differences between the claim structure and the structures of the prior art.

The amendment to claim 27 is supported in the specification at least at page 6, lines 1-3; page 8, lines 9-19; and page 12, lines 19-20. The amendments to claims 43 and 44 reflect the withdrawal of claim 42. No new matter has been inserted.

Rejection under 35 U.S.C. § 103(a)

Before discussing the Examiner's Action in detail, Applicants point out that the invention is a multilayered structure having an exterior decorative thermoplastic layer combined with an interior cured thermoset fiber reinforced composite. Such a layer can be used as a structural member in a variety of applications including automotive applications, tub and shower surround bathroom applications, boat hull applications, and other applications requiring strength and a substantially improved decorative appearance.

Prior to Applicants' invention, commonly structures have been made by first placing a "gel coat" layer in a mold and then combining that gel coat layer with additional layers of typically thermoset composite materials. In use, such gel

coat/thermoset layers can discolor, crack or chip leaving a less than desirable decorative appearance. Applicants' invention provides an exterior thermoplastic layer that can be made highly resistant to fading, cracking or chipping, solving many of the severe problems occurring with gel coat layers. Applicants have found the multilayer structure to be particularly suitable for structural application since the acrylic, thermoplastic and fiber reinforced composite layers, once molded, are rigid structural, mechanically intact and stable, will not separate and provide a decorative exterior with a strong mechanically stable structural interior. The Examiner should carefully note that, as claimed, the term "cured fiber reinforced thermoset resin composite" connotes a layer in which the fiber reinforces the entire thermoset resin layer and is not simply a portion or a layer separate from the an adjacent thermoplastic or thermoset layer.

In paragraphs 2 through 5 of the Examiner's Action, the Examiner has rejected claims under 35 U.S.C. § 103(a).

The Examiner states that claims 27 - 33, 35-40, 44, and 47-49 are unpatentable over Higashi et al, U.S. Patent No. 6,818,302. Applicants understand that the Examiner asserts that Higashi et al. teach an acrylic layer, an additional layer and a reinforcing fiber layer. Applicants have reviewed Higashi et al. and the secondary references cited by the Examiner and assert that none of these references show a layered structure having three layers of a thermoplastic sheet or laminate combined with a fiber reinforced cured thermoset composite layer to form a structural article. Applicants respectfully traverse the rejection.

Applicants understand the Examiner's statement to the effect that the Higashi et al. layers contain a reinforced layer. Applicants assert that the Higashi et al. reference does not contain a layer in which any resinous materials and a fiber layer is combined to form a fiber reinforced resin composite layer. The structures in Higashi et al. wholly include thermoplastic (non-thermoset) fiber reinforcements as a separate layer. No composite layers are formed. The Higashi et al. structure can be thermoformed while the claimed structure cannot. The claimed materials require that the cured, crosslinked resin and the fiber reinforcement are in the form of a composite and not in the form of a layered structure. Amended claim 27 now recites the presence of a cured thermoset fiber

reinforced composite layer. None of these references show such a layer in combination with the thermoplastic layers of the composite structure.

As amended, claim 27 specifies a fourth layer having a cured fiber reinforced thermoset resin composite. Higashi et al., at Column 2, lines 49-52, do not teach a layer having thermoset with a fiber reinforcement. Rather, Higashi et al. teach a reinforcement of a polypropylene based resin that is thermoplastic, because the layer containing the reinforcement is reinforced in order to prevent "curling during thermoforming" (Column 2, lines 41-46). Thermoset resins cannot be used in thermoforming. Thus, the thermoplastic layer or laminate of the present invention is thermoformed prior to addition of the fiber reinforcement and the thermoset resin. Higashi et al. do not teach the addition of a thermoset resin or a fiber reinforced layer to the laminate after thermoforming. The current invention is therefore not taught or suggested by Higashi et al.

All the remaining claims are dependent on claim 27 and thus include the limitation of the cured fiber reinforced thermoset composite layer of the claim as amended. Applicants submit that the subject matter of claims 27-33, 35-40, 44, and 47-49 is not obvious under 35 U.S.C. § 103(a) in light of Higashi et al. and respectfully request withdrawal of the rejection.

The Examiner further states that claims 34 and 43 are unpatentable over Higashi et al. in view of Wanat et al., U.S. Patent No. 6,852,405. In light of amended claim 27 and since Wanat et al. do not supply the disclosure missing from Higashi et al., Applicants respectfully traverse the rejection.

Applicants submit that Wanat et al. do not teach the use of ABS polymers to impart adhesion between layers of a laminate. Rather, Wanat et al. teach the use of butyl methacrylate - methyl methacrylate copolymer as an additive to an acrylic polymer layer in order to gain adhesion of the acrylic layer to a high impact polystyrene (HIPS) layer (Column 4, lines 49-51 and Column 6, lines 1-8). Wanat et al. teach the use of ABS, in contrast, as a structural plastic over which the capstock laminate of the invention may be placed (Column 1, lines 33-38 and Column 6, lines 22-23).

When combined with Higashi et al., Wanat et al. do not teach or suggest the use of ABS to provide adhesion between a thermoplastic layer and a fiber reinforced

thermoset layer. Rather, Wanat et al. specifically teaches adhesion of acrylic polymer to HIPS. Applicants respectfully request that the obviousness rejection be withdrawn.

The Examiner further states that claims 41, 42, 45, and 46 are unpatentable over Higashi et al. and Wanat et al. in view of Motoi et al., U.S. Patent No. 6,605,343. Claim 42 is canceled. In light of amended claim 27, Applicants respectfully traverse the rejection of claims 41, 45, and 46.

Motoi et al. teach the use of polyurethane foam reinforcement in laminated structures. However, the combination of Motoi et al. and Wanat et al. with Higashi et al. does not teach all the claim limitations of claims 41, 42, 45, and 46. Specifically, the cited references do not teach the combination of polyurethane foam layer with a fiber reinforced thermoset layer; a layer of acrylic polymer, ASA or ABS-acrylic alloy; a layer of thermoplastic; and a layer of acrylic. Nor does anything within the cited references suggest using such a combination of layers. Applicants respectfully request that the obviousness rejection be withdrawn.

In view of the above amendments and remarks, Applicants respectfully request a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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